

Appendix E-8: Main Basin

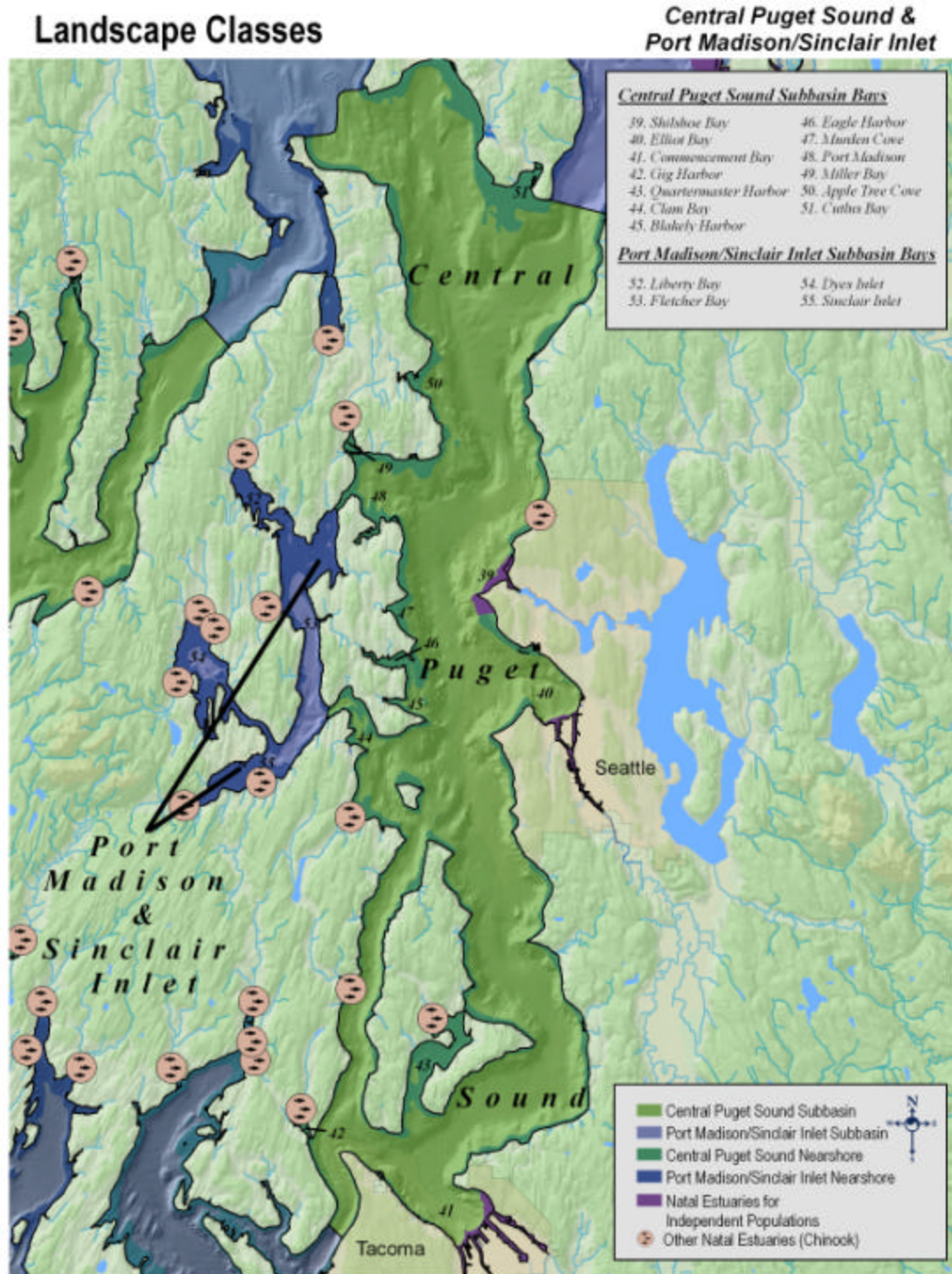


Figure E-8.1 Port Madison/Sinclair and Main Basin Landscape Classes

Landscape Functions

Central Puget Sound & Port Madison/Sinclair Inlet

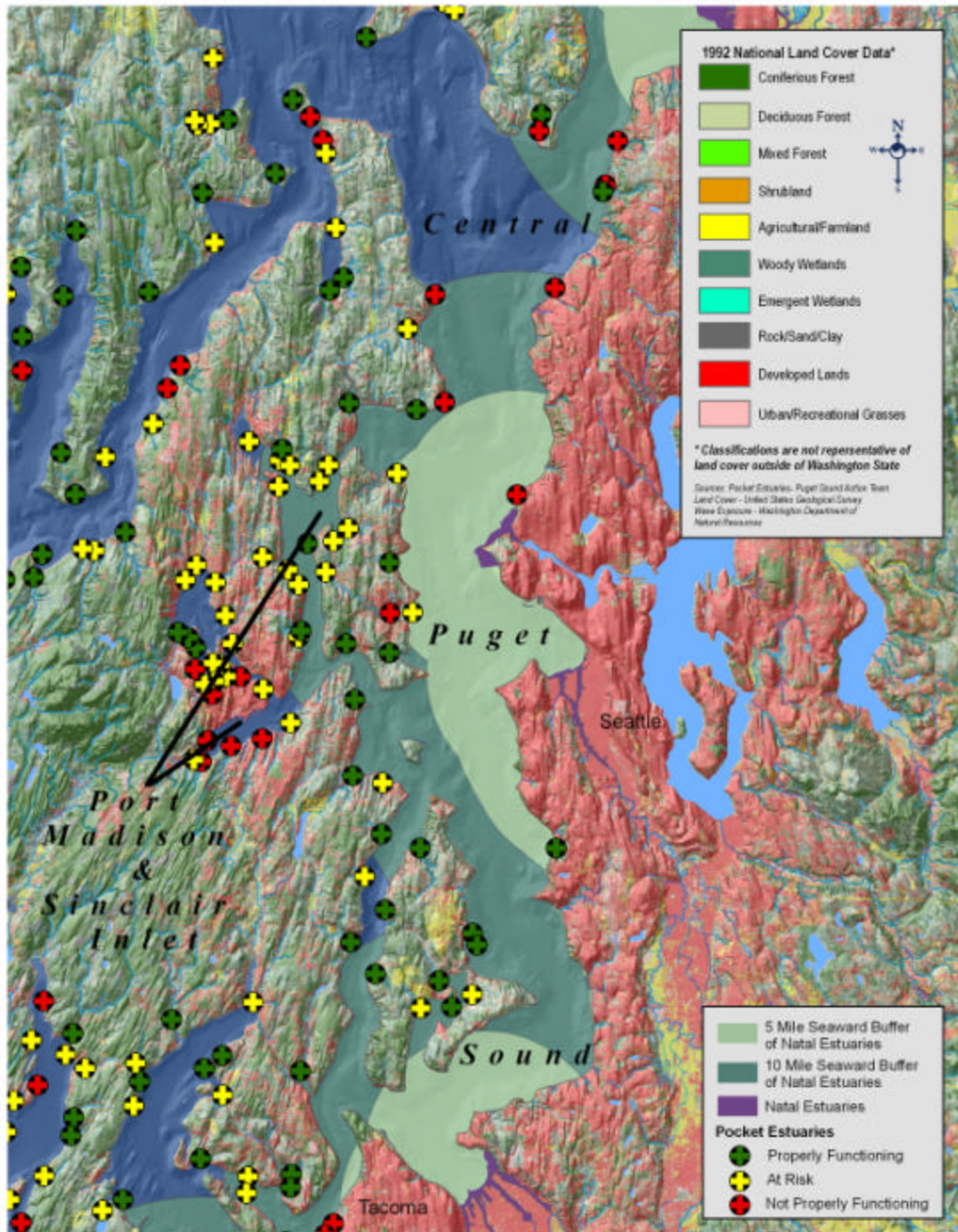


Figure E-8.2 Port Madison/Sinclair and Main Basin Landscape Functions

Figure E-8.4 Central Puget Sound (Main Basin) pocket estuary locations, likely Chinook functions, and observed stressors

Pocket Estuary Identifier	Latitude	Longitude	Photo ID #	Freshwater (Y/N)	Likely Chinook Functions			Shoreline Development	Urbanization	Diking and Filling	Susceptibility to spills and discharges	Aquaculture related substrate alterations	Vulnerability to Sea Level Rise	Final Chinook Function Score			
					Feeding	Osmoreg.	Refuge										
¹S1-Big Gulch	47.911	122.32	000925-123204	Y	x	x		x		x	?		x	NPF	PF = Property Functioning		
¹S2-Picnic Pt. Park1	47.884	122.33	000925-123324	N			x	x	x	x			x	NPF	NPF=Not Properly Functioning		
¹S3-Picnic Pt. Park2	47.88	122.332	000925-123336	Y	x	x	x	x	x					PF	AR=At Risk		
¹S4-Shell Creek	47.821	122.373	000925-123642	Y	x	x	x	x						NPF			
¹S5-Meadow Point	47.695	122.403	000925-124406	N				x		x				NPF			
¹S6-Seahurst	47.481	122.36	000925-132924	Y	x	x								PF			
¹S7-Gig Harbor	47.342	122.584	000817-145448	Y	x	x	x		x					PF			
¹S8-Olalla	47.421	122.542	000923-104424	Y	x	x	x			x				PF/AR			
¹S9-Fragaria	47.461	122.531	000923-104856	Y	x	x	x	x	x					AR			
¹S10-Driftwood Cove	47.487	122.517	000923-105022	Y	x	x	x							PF			
¹S11-Harper	47.518	122.517	000923-105344	Y	x	x	x	x		x	x			AR			
¹S12-Curley Crekk	47.522	122.544	000923-105624	Y	x	x	x							PF			
¹S13-Little Clam Bay	47.568	122.544	000923-110542	N	x		x					x (look like		PF			
¹S14-Lynwood Center	47.602	122.553	000926-114912	Y	x	x	x			x				PF			
¹S15-Blakely Harbor	47.597	122.514	000926-115536	Y	x	x	x							PF			
¹S16-Winslow	47.621	122.514	000926-120338	N	x			x	x	x	x		x	NPF			
¹S17-Wing Point	47.622	122.494	000926-120420	N			x							AR			
¹S18-Murden Cove	47.652	122.516	000926-120712	Y	x	x	x							PF			
¹S19-Point Monroe	47.706	122.511	000926-121224	N(?)	x	x(?)	x	x	x		x(recreational bc			AR			
¹S20-Miller Bay1	47.748	122.556	000924-104606	Y	x	x			x					PF			
¹S21-Indianola	47.745	122.495	000924-105348	Y	x	x	x							PF			
¹S22-Point Jefferson	47.75	122.47	000924-105954	N	x		x							NPF(?)			
¹S23-Appletree Cove	47.794	122.505	000924-110222	Y	x	x	x		x					AR/PF			
¹S24-Apple Cove Point	47.815	122.481	000924-110516	N	x		x		x	x				NPF			
¹S25-Deer Lagoon	47.993	122.481	010411-132956	N	x		x	x		x			x	AR			
¹S26-Sunlight Beach	47.988	122.47	010411-133152	N	x		x			x				AR			
¹S27-Cultus Bay1	47.926	122.389	010411-133902	Y	x	x	x			x			x	PF/NPF			
¹S28-Cultus Bay2	47.916	122.391	010411-134040	N			x	x	x	x	x(recreational bc			NPF			
¹S29-Klahanie	47.428	122.433	000923-103134	N			x							PF			
¹S30-Point Heyer	47.421	122.429	000923-103056	N	x		x							PF			
¹S31-Quartermaster1	47.391	122.432	000923-101454	Y	x	x	x			x				AR			
¹S32-Judd Creek	47.399	122.462	000923-101022	Y	x	x	x							PF			
¹S33-Burton	47.383	122.45	000923-100750	N	x		x							PF			
¹S34-Magnolia	47.382	122.478	000923-100508	Y	x	x	x		x					AR			
¹S35-Lisabeula	47.402	122.519	000925-135600	Y	x	x								PF			
¹S36-Sunset Beach	47.441	122.512	000925-135414	N(?)	x		x							PF			
¹S37-Shingle Mill Cr.	47.479	122.482	000925-135120	Y	x	x								PF			

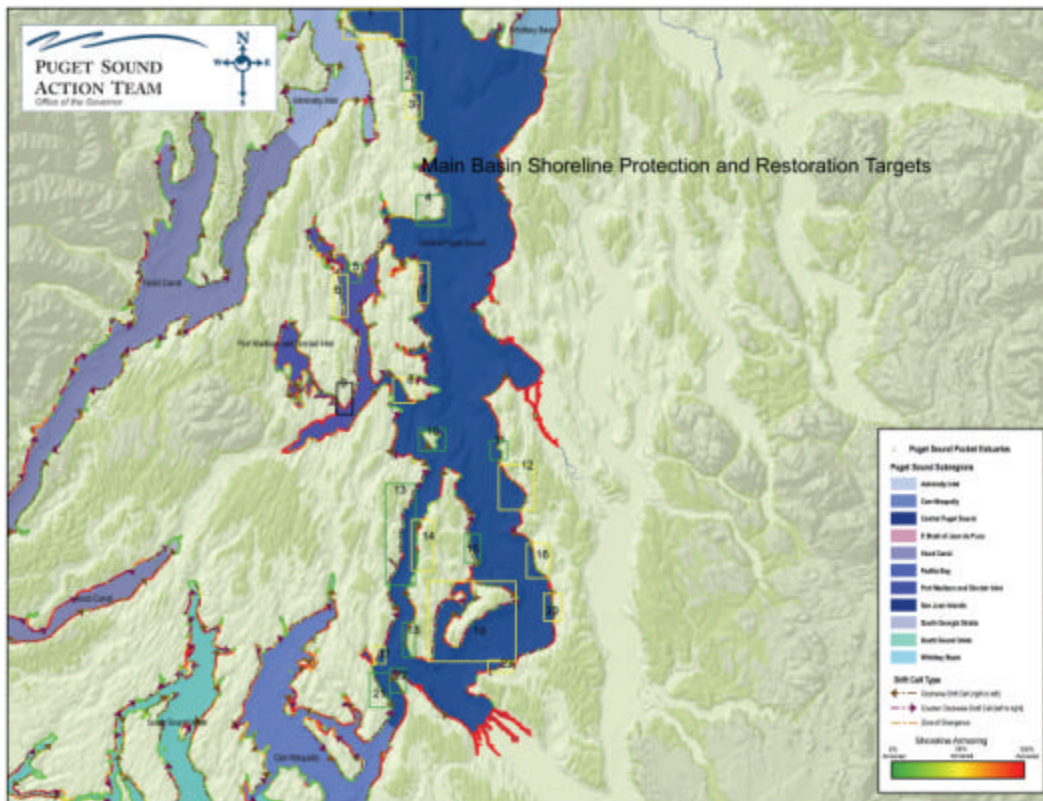


Figure E-8.5 Central Puget Sound (Main Basin) and Port Madison/Sinclair analysis of drift cells and shoreline armoring

Main Basin

Boxes 1,2 and 3 – Two long, convergent drift cell carry sediments southward from Foulweather Bluff on Admiralty Inlet and northward along the Hansville shoreline to the depositional feature, Point No Point. The southern drift cell is constrained by a number of cross-shore structures such as marine railways, boat launches and piers in the feeder section (box 3) but becomes much less armored in the transport and depositional sections to the north (box 2). The northern drift cell (box 1) is similarly constrained as box 3. Restoration should be considered in boxes 1 and 3 along with the protection of box 2 to maintain the structure and improve the function of this shoreline as it is critical for the outmigration of many populations of Chinook from within Puget Sound and may also be used by outmigrating Hood Canal summer chum as well.

Box 4 – This box contains the feeder sections of two divergent drift cells in a relatively unarmored state. These drift cells supply sediments to shorelines with broad subtidal shelves and numerous depositional features. In fact, the longshore transport processes seem to have cut off access to several historic pocket estuaries to the north toward Carpenter Creek but appear to continue to be in equilibrium with deltaic processes of the

two properly functioning pocket estuaries to the west of the feeder bluff. It will be important to understand the role of the northward drift cell if undertaking any pocket estuary restoration south of Kingston.

Boxes 5 and 6 – These two northward moving drift cells flank the mouth of Liberty Bay and continue to provide sediment which along with deltaic sediments from several small stream mouths shapes much of the shoreline. While the bluffs in box 5 are currently being protected within the Port Madison Indian Reservation, some restoration of drift cell function should be considered in the feeder section of box 6 which supports a broad intertidal and subtidal shelf and a long depositional spit adjacent to the Keyport Naval installation.

Box 7 - Much of this northeastern shoreline of Bainbridge Island consists of one large northward moving drift cell that carries both deltaic and bluff sediments northward from Murden Cove, deposits a broad shelf at Skiff Point and terminates in a spit at Port Madison. The central part of this drift cell contains a moderate amount of riprap armoring and some small scale fills into intertidal zone. Restoration of this relatively small area could restore function to a large section of shoreline as the rest of the drift cell seems to be functioning quite well.

Box 8 – This long drift cell starts at the southernmost tip of Bainbridge Island and continues northward along Rich Passage to Lynnewood Center. It contains unique geologically uplifted features along the Seattle fault, a state park shoreline and moderate amounts of coastal development. This drift cell has been embroiled in the controversy over perceived erosion threats from ferry wakes. Much of the drift cell is unarmored so restoration should be considered taking into account the constraints mentioned above.

Box 9 – The shoreline inscribed by Box 9 is the location of a historic divergence zone of two very long drift cells both traveling northward. The drift cell along the eastern shoreline of the Kitsap Peninsula interacts with four pocket estuaries, including Illahee State Park and is probably extended in length by strong tidal currents through Port Orchard. Both drift cells suffer from extensive residential development where cross-shore structures and fill are commonplace. Beach nourishment should be considered within box 9 to add sediment back into these extensive drift cells and rebuild some of the historic function of these shorelines for larger life history types of salmon that migrate from other parts of Puget Sound through this area.

Box 10 – All shorelines of Blake Island should continue to be protected. There is an extensive shallow shelf on the north and east sides of the island likely created by long term exposure of island bluffs to the open water fetch of waves in central Puget Sound.

Boxes 11 and 12 – Protection within box 10 and restoration within box 12 will support the feeder functions of one of the longest drift cells in central Puget Sound. This drift cell continues northward from just north of Three Tree Point to Alki Beach and contains a variety of bluff and low bank features including some extensive shallow shelves. Recent

bulkhead removal at Seahurst Park in Burien should act as an anchor project for further restoration opportunities within this drift cell. There are quite a few high bank properties with no immediate waterfront development, yet the properties still contain riprap or other armoring. Extensive shoreline residential education and landowner incentives should take place within this drift cell to maximize the restoration potential.

Boxes 13 and 14 – These shorelines within Colvos Passage support a large number of pocket estuaries due to the interaction of small streams and strong tidal currents. Most development seems to have occurred on small depositional features within the drift cells and doesn't appear to be limiting overall drift cell function within box 13. Box 14 shorelines should be considered for restoration where some residential properties appear to have filled into the intertidal zone.

Box 15 – This southward drift cell is largely unarmored and supports a large depositional feature at Point Heier, which contains a pocket estuary.

Box 16 – This drift cell contains the sediment source for Three Tree Point. Natural geologic features left over from the glaciers interact with sediment transport in the vicinity of Three Tree Point to create a broad sub-tidal shelf. Limited restoration should be considered to improve the functions of this drift cell.

Box 17 – While much of this long drift cell on the southeast Pierce County shoreline near Gig Harbor is armored due to residential development, the armoring is largely in the transport and depositional sections of the cell. The “feeder” section is considerably less armored and can continue to provide function to the entire drift cell if no further armoring occurs and limited restoration is considered. Tidal currents are strong here because of the proximity of this shoreline to the Tacoma Narrows.

Box 18 – The southwest tip of Vashon Island contains the feeder section for a long drift cell continuing northward into Colvos Passage. It is largely unarmored and should be protected to prevent further perceived erosion risk in the transport and depositional sections of the cell.

Box 19 – The complex shorelines of Maury Island and Quartermaster Harbor are some of the most important forage fish spawning beaches within central Puget Sound. Three large drift cells move northward along both shorelines at the opening of Quartermaster Harbor and the southeastern shoreline of Maury Island. There are numerous pocket estuaries within inner Quartermaster Harbor, which create a shallow subtidal shelf when interacting with the northward drift. Restoration of all shorelines within box 19 should be considered due to the importance of the forage fish resource to all life history stages of Chinook salmon.

Box 20 – This relatively unarmored shoreline should be considered for protection and restoration of its drift cell functions. It is one of the longest stretches of unarmored shoreline in this part of the sound and supports a broad subtidal shelf northward toward Des Moines. The Saltwater State Park is contained within this drift cell and could

become an anchor demonstration project for restoration by bulkhead removal for this entire drift cell, much like Seahurst Park to the north. Aggressive homeowner education and incentive programs should also be considered to restore function to this drift cell.

Boxes 21 and 22 – This unarmored shoreline is directly adjacent to Commencement Bay and the Puyallup estuary. It is expected that shorelines within Point Defiance Park will remain protected. However, the large southward drift cell within box 21 should be protected from armoring by bluff property owners. The steepness of the bluffs and the active tidal currents along the Narrows suggest Pierce County's critical areas ordinance will play a large role in protecting drift cell function. Continued homeowner education on bluff stewardship should be targeted to this area.

Box 23 – This short, divergent drift cell is largely unarmored because of the presence of Dash Point State Park. This shoreline is directly adjacent to Commencement Bay where Puyallup and White River Chinook stocks enter Puget Sound and the shoreline likely supports a number of small Chinook life history types because of that proximity. The deltaic sediments from the park and erosion of adjacent bluffs creates a broad intertidal and subtidal shelf that continues north to Dumas Bay where Joe Creek adds additional sediment to the shelf. There are a small number of houses at the base of the bluff which appear to be at risk of landslides. Pierce County should prepare long range plans to reduce that risk and at the same time restore drift cell function to this important shoreline.